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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,394	04/09/2004	Anders Landin	5181-95101	1590

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MHKKG/SUN
P.O. BOX 398
AUSTIN, TX 78767

EXAMINER	
PATEL, KAUSHIKKUMAR M	
ART UNIT	PAPER NUMBER
2188	
MAIL DATE	DELIVERY MODE
04/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,394	LANDIN ET AL.	
	Examiner	Art Unit	
	KAUSHIKKUMAR PATEL	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/19/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's communication filed January 08, 2008 in response to PTO Office Action mailed October 09, 2007. The applicant's remarks and amendments to the claims and/or specification were considered with the results that follow.

2. In response to last Office Action, claims 6, 19, 32, and 35 have been amended. No claims have been canceled. No claims have been added. As a result, claims 1-44 remain pending in this application.

Response to Arguments

3. Applicant's arguments filed January 08, 2008 have been fully considered but they are moot in view of new grounds of rejections.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on February 19, 2008 has considered by the examiner.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-44 rejected under 35 U.S.C. 103(a) as being unpatentable over Rowlands et al. (US 2004/0034747) in view of Rowlands (US 2003/0217216) (Rowlands-2 hereinafter) and Singhal et al. (US 5,978,874).

As to claims 1 and 2, Rowlands teaches a system, comprising:

a node (Rowlands, fig. 10, item 1000 a-d) including one or more active devices (Rowlands, fig.11, items 1102, 1104), an interface (Rowlands, fig. 11, item 1118) and an address network configured to transmit address packets between the one or more active device and the interface (Rowlands, par. [0059]);

an additional node coupled to the node by an inter-node network, wherein the additional node includes an additional address network (Rowlands, fig. 11);

wherein a given active device having ownership responsibility for a coherency unit is configured to respond certain access right request (Rowlands, par. [0064]);

wherein in response to receiving from the additional node via the inter-node network, a coherency message requesting an access right to a coherency unit (Rowlands, par. [0063], "if a node wants to access remote line, it makes a request to the home node for that line"), the interface is configured to send a first type of address packet on the address network if a global access state of the coherency unit in the node is a modified state and to send second type of address packet on the address network if the global access state of the coherency unit in the node is not the modified state (Rowlands, pars. [0072] – [0074] teaches NC 1118 is responsible for implementing the

inter-node coherency using RLD 1116, which keeps track of global states of the cache line, he further teaches "if the line is shared (i.e. not modified), a Kill command can be issued. If it is borrowed Modified, a cFlush must be issued").

Rowlands expressly fails to teach wherein if the given active device has an ownership responsibility for the coherency unit, the given active device is configured to ignore the second type of address packet and to respond to the first type of packet. However, Rowlands teaches a multi-node system with dual level of coherency (e.g. at intra-node level coherency and inter-node coherency), with inter-node (global access states) coherency comprises modified, shared or invalid states and intra-node coherency comprises MESI or other type of coherency states (Rowlands, par. [0028]). He also teaches when the cache block having inter-node coherency (i.e. global access state) as modified state, active devices within the node can have read and write access to the cache block (Rowlands, par. [0071]), if the inter-node coherency state of the block is shared state, then active devices within the node can have read access right and invalid state, the device may not read or write (i.e. no valid copy of data). (Rowlands, par. [0070]). Rowlands further teaches that an agent can acquire ownership of a line before it actually acquires the data and if other device requests the data from same line the owner does not immediately send the data (i.e. ignores the request initially, thus it can be inferred that the transition in ownership and access right occurs at different times) (Rowlands, par. [0066]). Here it is again noted that an agent can have ownership but no data, means the global state of the node is still shared or invalid (to prove this point, please refer to teachings of Rowlands-2 and Singhal). According to Rowlands-2,

the requesting agent has ownership of affected cache block in the node 10A (intra-node ownership), the node 10A may not have global ownership of the cache block (inter-node ownership), and the inter-node ownership may occur in response to the transfer of data, i.e. the agent in the node can have ownership responsibility without data, but the global ownership is not perfected yet, hence the agent do not have proper access right to the cache line yet (see pars. [0111] and [0112] of Rowlands-2). Further, according to Singhal, a board becomes owner as soon as it requests ownership, using ReadToOwn address bus packet, on the other hand the writer is the board that actually has the data for the line. He also teaches that the authorship (access right) follows ownership from board to board (Singhal, col. 27, line 43 – col. 28, line 30). Thus, from above discussion, it is entirely evident that if the global access state of the coherency unit in the node is shared and/or invalid, there can be ownership of the data (i.e. ownership without data) but the agent with ownership do not respond to the access request (i.e. ignores), however if the global access state of the node it modified (i.e. node or agent within the node has data in exclusive state (Rowlands, par. [0071]) and hence it responds to the request for cache line. With respect to limitation, first type of address packet and second type of address packet, Rowlands-2 teaches that a single transaction may be used for probes and in still other embodiments, there may be a probe generated transaction that invalidates agent copies of the cache block and another probe generated transaction that permits agents to retain shared copies of the cache block (Rowlands-2, par. [0058]). As such, it is clear to one having ordinary skill in the art at the time of the

invention to use one transaction or two transactions (i.e. first and second type of address packets) to effect the coherency.

As per claim 2, Rowlands teaches multiple nodes (Rowlands, fig. 10) having multiple active device (Rowlands, fig. 11, items 1102, 1104) with respective interfaces (e.g. NC-1118), where it is readily apparent that respective interfaces allows sending/receiving coherency messages in intra-node and inter-node communications.

As to claims 3-6, the claims recites read-to-share packets to gain shared access right to coherency units and transitioning of ownership or not, Rowlands teaches read-shared and read-exclusive commands to obtain data in either shared state or exclusive state (Rowlands, par. [0078]) and as explained above with respect to inter-node and intra-node coherency, one having ordinary skill in the art at the time of the invention would have realized that when data was in modified state at one node and other node wants share the data, then the inter-node state is changed from modified to shared and the modified data must written back to memory, thus satisfying either transitioning ownership or not if data at inter-node state is in shared-state.

Claims 7-9, recite read-to-own (readexc) packets as well as proxy-read-to-own packets, Rowlands as explained above with respect to claims 3-6 teaches similar transactions (Rowlands, pars. [0078] – [0081]) and also proxy packets (e.g. probe packets, par. [0080]) thus satisfying limitations of claims 7-9. It is also readily apparent from Rowlands, that in response to read-to-own packets, the node holding exclusive copy of data sends data to requester and transitions its global state to invalid, and requester's state to modified, indicating transitioning of access rights.

Claims 10-12 recite, invalidate packets, Rowlands-2 teaches invalidating packets of a node providing data in response to requester's read-to-own (readexc) packets (par. [0073]).

As to limitations of claims 13 and 14, use of directory less (broadcasting) and directory protocols are known in the art and depending upon the configuration of system one having ordinary skill in the art would have used point-to-point type of protocol in the system containing large number of device to reduce the traffic or would have used broadcasting in system having smaller number of device to reduce the overhead of maintaining directory.

Claims 15-44 are also rejected under same rationales as applied to claims 1-14 above.

Conclusion

7. The examiner also requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s) in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

8. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAUSHIKKUMAR PATEL whose telephone number is (571)272-5536. The examiner can normally be reached on 7.30 am - 4.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAUSHIKKUMAR PATEL
Examiner
Art Unit 2188

/kmp/

/Hyung S SOUGH/
Supervisory Patent Examiner, Art Unit 2188
04/27/08